

Sea-beach Amaranth

Amaranthus pumilus Rafinesque

Summary

Sea-beach amaranth is an annual plant of the Amaranth family (Amaranthaceae) that exhibits low sprawling growth and small spinach-like leaves, and is restricted to open sandy portions of ocean beaches between the high tide line and the toe of the primary dune. It was first collected in the early Nineteenth Century in New Jersey, and its range was subsequently determined to extend from Massachusetts to South Carolina. Although originally described as abundant, the number of populations of *A. pumilus* declined precipitously throughout the Twentieth Century and, following a collection from Ocean County in 1913, vanished from the flora of New Jersey. Habitat destruction and alteration, incompatible beach grooming practices and recreational activities have all contributed to the decline of this species. By 1989, the species was restricted to a few populations in North and South Carolina. In 1991 New Jersey included *A. pumilus* in its first official Endangered Plant Species List, and in 1993 the U.S. Department of the Interior, Fish and Wildlife Service, determined *A. pumilus* to be a federally threatened species under the authority of the Endangered Species Act. In 2000 the plant returned to newly created beaches in Monmouth County and adjacent habitat in Sandy Hook. Intensive surveys performed in 2001 revealed populations or individuals in all four coastal New Jersey counties. Despite its reappearance, the plant remains highly vulnerable to the uses and practices that caused its extirpation throughout most of the previous Century.

Description

An annual plant that exhibits low, relatively prostrate growth with fleshy, rounded, dark green leaves (1-2 cm long) clustered near the tips of fleshy, reddish stems. Plants germinate from April to July, initially forming a small sprig but soon branch and form a clump which binds sand that accumulates at its base. Larger plants may contain over one hundred stems which branch from the center and attain a diameter of over a meter, although plants are typically 20-40 cm in diameter. Flowering begins in June with seed production in July and until senescence in early winter. Plants are monoecious (having male and female flowers on the same plant). The inconspicuous yellow flowers are borne in the leaf axils and are wind pollinated. The species is a prolific seed producer, and the waxy seed are relatively large (2-2.5 mm) and are believed to be viable for long periods. Seed dispersal may occur by wind, water and possibly birds, and whole plants and seed are temporarily buoyant. The life history of this plant, combined with the dynamic coastal habitat within which it evolved, give this species the ability to move within the coastal landscape as a fugitive species, colonizing habitat as it becomes available in both space and time.

Habitat and Associates

The species is restricted to sandy ocean beaches, and its habitat consists of the sparsely vegetated zone between the high tide line and the toe of the primary dune. This is also the zone in which seed are deposited and accumulate

following dispersal. Individuals are occasionally found on back dunes, exposed shoals, dune blowouts and bayside strands, although these occurrences tend to be small and temporary. Plants have also recently been found in beach replenishment areas. Additional plant species associated with this habitat include American beachgrass (*Ammophila breviligulata*), sea rocket (*Cakile edentula*), Russian thistle



Photo by Mark H. Burlas - U.S. Army Corps of Engineers

(*Salsola kali*), seaside spurge (*Chamaesyce polygonifolia*), seabeach sandwort (*Honckenya peploides*), seabeach knotweed (*Polygonum glaucum*), seabeach purslane (*Sesuvium maritimum*) and seabeach orach (*Atriplex arenaria*). However, *A. pumilus* is intolerant of competition, and generally only sea rocket occupies the specific zone where *A. pumilus* is predominantly found.

Distribution

Amaranthus pumilus was first collected about 1802 by C.R. Rafinesque from Tuckers Island in Ocean County, NJ, a 600-acre landform which was subsequently eliminated from the geography of the state by a series of severe storms during the early 20th Century. The plant has since been collected from numerous states bordering the Atlantic Ocean and its historical range extended from Massachusetts to South Carolina. A rangewide census of the plant in 1990 revealed 55 remaining populations (34 in NC, 8 in SC, 13 in NY), and extirpation from six states throughout its historical range. In New Jersey, although the plant was described as frequent in the late 19th Century, its abundance soon declined dramatically and a collection from Island Beach State Park, Ocean County, in 1913 was the last time the species had been collected in NJ until 2000. In 1989 New Jersey included *A. pumilus* in its first official Endangered Plant Species List, and in 1993 the U.S. Department of the Interior, Fish and Wildlife Service, determined *A. pumilus* to be a federally threatened species. Since the last rangewide census, severe reductions in populations in the Carolinas as a result of a series of hurricanes and Northeasters were accompanied by the reappearance of several populations on Long Island, NY, in 1990. In 2000 *A. pumilus* was discovered during piping plover survey activities in Monmouth County, NJ, by the Army Corps of Engineers on newly created beaches. A total of 919 plants were subsequently found in 2000 in the area between and including Monmouth Beach and Sandy Hook. Statewide surveys performed in 2001 found 5,813 plants in all four coastal counties, although all but 69 of these plants occurred in the Monmouth Beach–Sandy Hook area. Theories for the reappearance of *A. pumilus* in the NY-NJ region include transport of seeds through storm events and/or resurfacing of seed from beachfill operations.

Threats

Habitat destruction and alteration combined with the recreational development and public use of ocean beaches were responsible for declines in *A. pumilus* beginning in the late 19th Century and remain in effect today. Recreational use and the practices used to groom beaches for such recreational activities destroy plants and effectively preclude the establishment of plants. These activities include beach raking, scraping, compaction by beach buggies and other vehicles, and trampling. In addition, hard stabilization structures, like jetties, groins, seawalls and bulkheads, eliminate or drastically alter the habitat required by this species. Finally, herbivory by several species of native webworms, likely exacerbated by coastal habitat development, is believed to have contributed to the decline of *A. pumilus*.

Monitoring Recommendations

Annual monitoring of all suitable habitat for *A. pumilus* throughout NJ and development of a complete census of plants and their locations is minimally required, at least until stabilization of the statewide population is achieved. Special attention should be paid to beaches that receive beachfill renourishment, significant beach morphology alterations, and other impacts.

Management Recommendations

Symbolic string and post fencing, similar to that used to fence piping plover nest areas, should be installed surrounding all emergent plants, and all public access and beach maintenance activities prohibited within fenced areas. To help ensure plant reemergence in previously recorded locations or establishment in new areas, an area free of disturbance (raking, scraping, vehicle access, etc.) should be established during the growing season (May to December) in all or selected areas of suitable habitat extending from the toe of the primary dune or edge of established vegetation to the mean high tide line.

Selected References

Bucher, M. and A. Weakley. 1990. Status survey of seabeach amaranth (*Amaranthus pumilus* Rafinesque) in North and South Carolina. Report to North Carolina Plant Conservation Program, North Carolina Dept. of Agriculture, Raleigh, NC, and Asheville Field Office, U.S. Fish and Wildlife Service, Asheville, NC. 148 pp.

U.S. Fish and Wildlife Service. 1993. Endangered and threatened wildlife and plants; determination of seabeach amaranth (*Amaranthus pumilus*) to be a threatened species. Federal Register 58(65) 18035-18042.

U.S. Fish and Wildlife Service. 1996. Recovery plan for seabeach amaranth (*Amaranthus pumilus*) Rafinesque. Atlanta, GA. 59 pp.

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